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THE PRESIDENT'S ADDRESS.

GENTLEMEN,—One of the most important prerogatives and duties belonging to the Council of this Academy is the award of medals to the successful cultivators of those scientific and literary pursuits for the promotion of which the Academy was founded. We are now assembled for the purpose of carrying into effect resolutions adopted by the Council with reference to this matter towards the close of the past year; and to give greater solemnity to our proceedings, the representative of the Queen has been pleased to honour our meeting with his presence. He thus adds a fresh proof to the many which he has given of his own earnest sympathy with men of letters. He thus, I believe, exactly reflects the feeling and co-operates with the action of our gracious Sovereign. If Her Majesty is no longer supported by the counsel and aided by the services of her lamented Consort, we know that she is animated by that strenuous desire to promote the interests of learning which he never lost an opportunity of manifesting. Under our present Sovereign, and under our present Viceroy, the maxim "*Honos alit artes*" will not be lost sight of.

I will now proceed, Gentlemen, with your permission, to notice the several works for which the Council has resolved to confer Cunningham Medals.

A Cunningham Medal has been awarded to the Rev. Humphrey Lloyd D. D., for his original and important researches in Physical Optics, Magnetism, and Meteorology. Every member of the Royal Irish Academy will readily admit the high claims of Dr. Lloyd to any honour which we can confer. We all feel, too, that these claims are founded, not only on the scientific eminence which he has so justly attained, but also on the fact that so large a portion of his discoveries have been given to the world through the medium of our Transactions and Proceedings. The first gave him a claim which the whole scientific world would be ready to endorse; the second gives to this claim a new and peculiar force as regards ourselves. And, although the medal which I am about to present to Dr. Lloyd has been conferred on him professedly for memoirs recently published in our Transactions, I am sure that I do not misinterpret the feeling of the Council in saying that, when they resolved to confer it, their thoughts took a wider range, and that they desired thereby to testify their sense of the claims, accumulated during a long period, which Dr. Lloyd possesses on the scientific world generally, and more especially on the Royal Irish Academy. And you will not think that I misemploy your time, if I venture to transgress the period to which, in the adjudication of these medals, we are in strictness limited, and briefly to notice some of his earlier contributions to physical science. Let me select, as perhaps the most important of these, the experimental proof of the phenomenon of conical refraction. The history of this discovery must be ever memorable in the annals of science. It

is one of the rare instances of a successful theoretic prediction. You know that the ordinary course of scientific discovery is, that a phenomenon is first observed, and then accounted for. The experimentalist establishes its reality, and then the theorist endeavours to reduce it under a general law. Thus Kepler discovered that the planetary orbits are in fact elliptical, before Newton established the mechanical principles on which the form depends. The laws of reflexion and refraction were known as facts before Newton and Huygens endeavoured to reduce them under the more general laws of mechanics. But in the case of conical refraction, this order was reversed. The mathematical genius of Sir William Hamilton enabled him to predict this phenomenon as a consequence of Fresnel's theory, before the experimental skill of Dr. Lloyd established its reality. Sir William Hamilton saw that the rule by which Fresnel determined the course of the two rays into which a single incident ray is divided by crystalline refraction, appeared to fail under certain circumstances. With a certain disposition of the incident light, he found that not two, but an infinite number of directions might be found satisfying the laws of Fresnel, and from this indefiniteness he rightly inferred that light would actually pass along each of these directions; and that therefore, instead of emerging in two rays, the light would emerge in a hollow cone. With another disposition of the incident ray, he inferred, by similar reasoning, that the light would emerge in a cylinder. The establishment of the reality of these phenomena by Dr. Lloyd must be regarded as a great triumph of experimental skill. The difficulties attending such an investigation can, of course, be fully appreciated only by those who have been engaged in similar labours; but there is in these experiments one peculiar source of difficulty, which will be intelligible to every one—it is this, that they do not admit of approximation. Generally speaking, in conducting an experiment, if the adjustment of the apparatus be nearly, though not mathematically exact, the phenomenon produced will be nearly, though not exactly, that which we are seeking; and the more nearly we approximate to perfect accuracy of adjustment, the more nearly will the phenomenon actually produced approximate to that which is required. And therefore, in ordinary experiments, an indifferent observer, though he will not perfectly succeed, will not wholly fail. He will make an approximation to the truth—an approximation which, with increasing skill and greater attention, he will gradually render more and more close. With conical refraction it is not so. That phenomenon admits of no degrees. If the adjustment be not mathematically accurate, the phenomenon is not produced, *nor any thing like it*. The smallest deviation from the proper disposition of the incident light will cause the cone or cylinder to disappear, and to be replaced by the two rays which are seen under ordinary circumstances. Every one can understand the difficulty of even conducting such an experiment as this when the means of doing so have been already devised and put into the hands of the observer—a difficulty, indeed, so great, that observers have been found to deny the reality of the phenomenon.

But to devise the means by which the phenomenon might be produced, and, unassisted, to bring the experiment to a successful conclusion,—of all this, it is not too much to say, that it required in the observer the possession of experimental skill and genius of the highest order. Nor was Dr. Lloyd content with the mere exhibition of the phenomenon of conical refraction; he also examined carefully the elementary rays of which the emergent cone is composed, and succeeded in establishing experimentally the simple and elegant law by which the position of the planes of polarization of these rays is regulated. Passing now from optics to magnetism, we find that Dr. Lloyd's labours have been perseveringly and successfully directed to the improvement of the methods by which the intensity of the earth's magnetic force is measured. In a communication read before the Academy as far back as 1843, and printed in the twenty-first volume of our Transactions, he has pointed out a mode of reducing the error attending the determination of this quantity, by the ordinary method, to less than one-fifth of its amount. Adopting Biot's law of magnetic distribution, he has determined a relation between the lengths of the magnets employed, which not only simplifies the calculation, but also effects the above-mentioned important reduction in the error resulting from that observation. He has also, by a series of direct experiments, verified the accuracy of the method adopted, and thus incidentally given an important confirmation of the truth of the law of magnetic distribution which had been assumed. The same subject is resumed in a paper read before the Academy in the year 1858, in which Dr. Lloyd points out a fatal imperfection attending the ordinary mode of calculating the intensity of the earth's magnetic force, rendering that method quite inapplicable in high magnetic latitudes. The method proposed by Dr. Lloyd is wholly free from this imperfection; and, besides, requires for its application only the use of the dip circle—a vast advantage to the travelling observer, inasmuch as it reduces to the smallest possible number the instruments which he is compelled to carry with him.

DOCTOR LLOYD,—The medal which I have now the honour of presenting to you is a very inadequate token of the respect with which the Council of this Academy regards your labours in the various departments of physical science. Combining an exact knowledge of theoretical principles with a refined tact and ingenuity in experimental processes, you have devised methods of observation, the use of which has greatly facilitated the accumulation of the means of future discovery. You have employed these methods with diligence and success, in the accurate determination of quantities which it was most important to measure. You have also pointed out sources of error in received methods of observation. Your colleagues here look forward with a lively interest to the prosecution of those researches in terrestrial magnetism, of which you have recently communicated accounts to the Academy. Though these discoveries belong to a period later than that within

which you produced the memoirs for which this medal has been specially awarded, I feel that I am justified in referring to them as the results of the same well-trained sagacity which has characterized the whole series of your scientific achievements.

A Cunningham Medal has been awarded to Mr. Robert Mallet, for his researches in the theory of earthquakes. Prior to the year 1846, no true science of earthquakes existed; seismology, as a branch of terrestrial physics, has been since created. Mitchel, Dolomieu, Bylandt, Humboldt, and Darwin, the very latest writers on the subject, prior to 1846, all show that they had no clear conception either of the intimate mechanism, or of the connexion and order of events in earthquakes. The only *true hints* that had been given respecting them were those furnished, in little more than a sentence, by Dr. Young and Gay Lussac, "that they were of the nature of vibrations in solids." No adequate ideas had been formed of the character and limits of those vibrations, which were vaguely talked of as vorticose. In February, 1846, Mr. R. Mallet's paper on "the Dynamics of Earthquakes" was read to the Royal Irish Academy, and published in vol. xxi., p. 1, of its Transactions. In this paper he fixed upon an immutable basis the real nature of earthquake phenomena, and for the first time showed that the three great classes of phenomena,—1. Shocks; 2. Sounds; 3. Great sea-waves,—were all reducible to a common origin, formed parts of a connected train, and were explicable on admitted laws. This paper also for the first time explained the true nature of the movements that had been called vorticose, and viewed as the proofs of circular movements. Mr. R. Mallet proved that they were due to rectilinear motions. He also pointed out in this paper the important uses that might be made of earthquakes, as an instrument of discovering the depth beneath the earth's surface of the origin of the shocks,—hence of the volcanic foci,—and even of ascertaining ultimately the nature, as well as the temperature, of the formations within our earth, to a depth more profound than can be reached by any other mode of examination, or reached directly at all. He also showed that by seismologic means we may acquire some knowledge of the rock and other formations constituting the beds of the great oceans. This paper brought the subject of earthquakes in a prominent manner before the notice of geologists and physicists; and in 1849–50, Mr. R. Mallet drew up, at the desire of the British Association, a first report on the facts of earthquake phenomena, which, like his subsequent reports, four in all, was published in its Transactions. In this first report, he collected, classified, and drew inductive conclusions from all the important facts then known and published as to earthquakes, and pointed out how they co-ordinate with his first views of 1846. In the same year, he also designed the first completely self-registering Seismometer proposed, and published a description of it in our Transactions. In the three papers to which I have referred he pointed out, amongst other things, the importance of experimentally determining the velocity of movement of earthquake-waves, and

proposed to experiment upon the actual transit velocity of artificial shocks, obtained by the explosion of gunpowder; and aided by the funds of the British Association, he in 1849-50 completed a train of experiments by which he determined the transit wave-time of shock for wet sand as the lowest limit, and for solid granite as the highest amongst known cosmical media. The results, received at first with much surprise, in consequence of the low velocities of transit found, fully coincided with the author's theoretic views of 1846, and have since been amply confirmed, and shown to be accordant with the low velocities of natural shocks, as measured by Schmidt, Nöggerath, Mr. R. Mallet, and others. These experiments form the subject of his second British Association report of 1851. In his first report, Mr. R. Mallet had pointed out the importance of collecting into one great catalogue, and fully discussing in relation to space and time, &c., all recorded earthquakes, with a view to evolve any secular laws, if such existed. This laborious work he undertook with the efficient help of his eldest son, Dr. John William Mallet, now Professor of Chemistry at the University of Alabama; and between the years 1852 and 1858, they completed together the British Association earthquake-catalogue, embracing more than 6000 earthquakes, which form the subject of Mr. R. Mallet's third and fourth British Association Reports. In the fourth Report, he has discussed fully, and year by year, this mass of the statistical facts of earthquakes, extending from the earliest times of history to that date. The discussion of the facts evolved these amongst the most striking results:—1. That earthquakes are not truly secular phenomena in time; 2. That in modern times, when observations are best and most numerous, although the whole train of phenomena over time is irregular or non-secular, still there has been a decided preponderance of earthquakes occurring at intervals of from forty to fifty years, and that these periods of maxima occur *about the middle and the last decade of each century*. Mr. R. Mallet ventured to predict the recurrence of such a group of earthquakes for the then coming years, 1850, 1860, or thereabouts, and his prediction has been fully borne out. In the time-discussion, also, he showed that at present some part or other of the earth is subject to at least one great earthquake every nine months. 3. In the discussion as to distribution over the earth's surface, he pointed out for the first time that earthquakes follow the great lines of mountain chains and elevations, forming what he has denominated Seismic Bands, the whole of which he has laid down upon the Mercator Seismographic map of the world published by the British Association. The important and pregnant relations that this great fact possesses with respect to our future knowledge of volcanic action, were in some measure pointed out in this Report: their important bearing cannot be in this respect over-estimated. Between the period of publication of his first and second British Association Reports, Mr. Mallet had, at the request of Sir John Herschell, drawn up for the Admiralty Manual the article on earthquakes and the methods of observing them, which he further improved in the second edition of that work. This article has been translated into

French by Mons. Perrey, by desire of the Government of France; and into German by M. Jeittels, of the Imperial Gymnasium of Kaschau in Hungary, and of the Imp. Acad. of Sciences, Vienna; and prior to the breaking out of the war was about being republished, with large additions by the author, by the Smithsonian Institution of America, which offered to circulate at its expense a vast number of copies over the world of science. Prior to the completion of the discussion of the British Association Catalogue, Mr. R. Mallet proposed to the Royal Society and to the British Association, conjointly to undertake further experiments on the propagation of artificial earthquake shocks in stratified rock, by taking advantage of the great blasting operations going on at Holyhead. Aided by the funds of both bodies, he has completed these experiments, extending over a period of about four years, and last year reported to the Royal Society and to the Association. His results will appear in the forthcoming volume of the *Philosophical Transactions*, and also in the next *British Association Report*. They confirm his previous observations in sand and granite, &c., and comprise also some new and important results; amongst the rest this, which is new to science—that the rate of propagation of an earthquake shock is faster in the same medium as the originating impulse is more powerful—a fact full of import as respects natural earthquakes, and curiously confirming some of the theoretic views of Mr. Earnshaw. In December, 1857, occurred the great earthquake of Naples. Mr. R. Mallet represented to the Royal Society the importance of observing its effects; and with the partial aid, and by the desire of that body, he proceeded to the scene of the disaster, and under circumstances of some difficulty and inconvenience, applied new methods devised by him for the investigation of the direction and velocity of the shock. In the mathematical part of these inquiries he acknowledges the important aid he has derived from the skill of our fellow-academician, Professor Haughton, Professor of Geology, Trinity College, Dublin. Mr. Mallet's report on this expedition and investigation is now in the press, and will be published in about six weeks. It was read to the Royal Society in 1860, and an abstract of its contents has been published in the *Proceedings* of that body. The author fully succeeded in accomplishing what he set out with attempting, namely, to find within the shaken country, by mathematical or mechanical appeal to the objects shaken down or disturbed, both the spot on the surface vertically above the point whence the shock itself originated, and also the depth of this point or focus beneath the surface. And he has shown that, in this instance, the focus was about nine and a half geographical miles deep. He has been able to estimate both the shape and the size of the subterranean cavity forming the focus, and to deduce many interesting and valuable conclusions as to the temperature, pressure, work consumed in the shock, &c. The velocity of the wave-particle in shock he has proved to be very small, not more than twelve to eighteen feet per second, thus co-ordinating with the low velocity of transit before ascertained. Amongst other deductions of general interest, based upon strict mechanical laws, is the probability that the depth of focus of no earthquake exceeds about thirty geographical

miles; and as the earthquake focus is, in fact, also the volcanic one, that volcanic action within our planet is at present limited to about that depth. Mr. Mallet has shown that Seismology is capable of being used as an instrument of cosmical discovery; and he has also shown that its importance is far greater in this respect than in any of the relations of earthquakes to superficial geological changes produced or induced by shock.

MR. MALLET,—I have much pleasure in presenting to you the medal awarded to you by the Council of the Royal Irish Academy for your researches on the Theory of Earthquakes. To you, I believe, is due the credit of having been the first to disentangle and explain the complicated phenomena of these terrible visitations. You have measured the velocity of the waves of vibration propagated through the various solid materials of the earth-crust; you have marked the sound-wave of air, carrying with it the announcement of the catastrophe; you have followed the course of those tremendous breakers which have rolled in upon the trembling shores even at vast distances from the points where the ocean-bed has been agitated by subterranean commotion. Profiting by the indications furnished by riven walls and overthrown pillars, you have succeeded in pointing out the *locus* of the centres of earthquake disturbance. These researches of yours place within our reach a new *organon* of cosmical inquiry—a method supplying information respecting the temperature and structure of the earth-crust at distances unapproachable by any other known mode of observation. We can hardly desire for you enlarged opportunities of applying your theory, and testing the self-registering instruments which you have devised; but we earnestly hope that the development of these and other investigations in which you are engaged may still further redound to your own credit and that of this Academy.

A Cunningham Medal has been awarded to Mr. Whitley Stokes, for his work on Irish Glosses, edited for the Irish Archæological Society. The work for which this medal is conferred on Mr. Stokes is an edition of a Mediæval tract on Latin declension, with examples explained in Irish. The value of the tract itself lies in the large number of Irish words (about 1100) which are annexed as glosses to the Latin vocables, exemplifying the different declensions; many of these words are unregistered in our dictionaries; of others the meaning has hitherto been guessed at rather than known. The publication of the tract, even without any commentary upon it, would have been a useful contribution towards the production of that Irish dictionary, the want of which is so much complained of. Mr. Stokes, however, has added copious annotations on the Irish words, pointing out the relationship in which they stand to cognate words in other Indo-European languages. In executing this part of his task, he has instituted comparisons which throw much light upon the etymology of words and names in other languages, as well as the Irish. I might cite many examples to show how interesting these

comparisons are ; but it is enough to say here, and I think it can be truly said, that this volume contains the largest store of trustworthy comparisons of Welsh, Irish, Gaelic, Cornish, and Breton words with one another, and of the different Celtic forms, with Sanskrit, Zend, Greek, Latin, Gothic, Anglo-Saxon, English, and Old High German, that has hitherto been published. But the philologist is no longer satisfied with finding a similarity between roots in different languages ; he compares the structure of inflected words, and finds that common principles of formation run through the different members of a great family of languages. In this department of comparative philology Mr. Stokes has made discoveries, the merit of which has been recognised. In his commentary on the Irish Glosses, he has introduced considerable improvements in the declensional paradigms, and made a great advance in the analysis of declension. To the theory of the verb he has contributed important observations. He has, for instance, shown Schleicher's explanation of the relative form of the Irish verb to be inaccurate. He has also established the existence of a class of reduplicating roots. Such steps as these entitle him to the credit of being not only a successful scholar, but a worthy successor of Zeuss. I believe it was the "*Grammatica Celtica*" of Caspar Zeuss which inspired him with an interest in this branch of learning. The analytical power manifested in that work convinced him that it was possible to carry on Celtic researches in a philosophic spirit, and to establish principles of Irish philology and ethnology on a sure historical basis. Having completely mastered Zeuss' comprehensive work—a task by no means an easy one—he commenced a methodical search for the oldest grammatical forms, so precious to the philologist. In this labour he had the good fortune to receive help and encouragement from the late Dr. O'Donovan and Professor O'Curry, who opened to him many of the deepest and richest sources of information. But their aid would have availed him but little, if he had not been gifted with a remarkable linguistic faculty, and a most persevering industry. Conceiving that, in order to trace the development of the Irish language, the student should begin by examining the most ancient documents, he applied himself systematically to the work of copying the most remarkable of them with extreme accuracy. He thus amassed so rich a collection of specimens of the Irish language anterior to the eleventh century, that he has qualified himself to undertake the printing of Cormac's celebrated Glossary, long reputed the very touchstone of Irish philological learning. Whilst the Irish has ever been the primary and final object of all his philological researches, he has not confined his views to it. He has made himself familiar with the principles of Bopp's science of comparative philology, and has applied them to the other members of the Celtic family of languages. He has mastered the Cornish, a dialect obscured by corrupt spelling and ill-defined grammatical forms. Of this dialect he has printed a specimen, the miracle-play of our Lord's Passion, with a translation and grammatical notes. Neither did he omit, like most Irish and Welsh philologists, that essential guarantee of success, the acquisition of the sister-dialect. He has to a considerable degree mastered the Welsh.

Of this he has given proof in his critical edition of the earliest specimens of Welsh, taken from Cambridge and Oxford MSS. His collection of the old Welsh Glosses is more complete than that made by Zeuss, as it contains newly-discovered glosses from the MS. of Juvenius at Cambridge. I have entered into these details for the purpose of showing that Mr. Stokes' learning is of a solid kind. He has not amused himself, nor will he mislead his readers, by fanciful conjectures. The work which he has executed, and for which the medal of the Academy has been awarded to him, is a substantial contribution to Celtic philology. It will also secure to its author an honourable place in the estimation of those who understand, as he does, that every contribution to a more accurate knowledge of the Irish language is ultimately a contribution to Irish history. "For this," "as he says himself," "can never be written until trustworthy versions are produced of all the surviving chronicles, laws, romances, and poetry of ancient Celtic Ireland. Moreover, immediate results of high historical importance may be obtained by comparison of the words and forms of the Irish with those of the other Indo-European languages. Chronicles may, and often do, lie; laws may have been the work of a despot, and fail to correspond with the ethical ideas of the people for whom they were made; romances may misrepresent the manners and morals of their readers and hearers; and poetry may not be the genuine outcome of the popular imaginative faculty. But the evidence given by words and forms is conclusive—evidence of the habitat, and intellectual attainments, the social condition of the Aryan family before the Celtic sisters journeyed to the West—evidence of the period at which this pilgrimage took place as compared with the dates of the respective migrations of their kindred—evidence of the connexions existing between the Celts and other Indo-Europeans after the separation of languages."

DR. STOKES,—I am sure that every member of the Academy shares in the regret which I felt, when I was informed that his engagements rendered it impossible for your son to attend here to-night to receive the medal awarded to him by the Council. I place it in your hands—you will convey it to him, along with the assurance of our respect and good wishes. In the midst of professional pursuits carried on with diligence and success, he has found time to signalize himself by rendering important services to Irish philology. Having prepared himself for his task by a course of well-ordered study, he has produced a work remarkable alike for the diligence with which he has collected his materials, and the skill with which he has arranged them. He has brought together the largest collection that has yet been published of Celtic words, illustrated by the light of comparative philology. And, improving upon the teaching of Zeuss, he has been able to carry our insight into the system of Celtic declension to the farthest point which it has yet reached.

A Cunningham Medal has been awarded to Mr. John T. Gilbert for his "*History of the City of Dublin*." In undertaking this history, Mr. Gilbert

engaged in a task, the interest of which was equalled by its difficulty. In general, the historian derives help, in the execution of his work, from the labours of writers who have preceded him. Though they may have left omissions to be supplied, and mistakes to be corrected, they have, at least, furnished a mass of authentic matter, the possession of which places him in a position more advantageous than that of writers who have to construct their narratives out of the crude materials gathered from primary sources, annals, laws, charters, and the incidental notices preserved in ancient documents and monuments of various kinds. But Mr. Gilbert owes nothing to earlier histories of Dublin. The first work on the subject was the imperfect attempt of Harris, published, in a small volume, most inaccurately, after his death, in 1766. On this it would be unfair to pronounce a severe criticism. The design of the author had been left very incomplete, and the office of attempting to fill the outline which he had traced was committed to an incompetent compiler. So limited in extent was this small history of the city of Dublin, that but four pages of it were devoted to the description of St. Patrick's Cathedral and eighteen churches. The entire of Harris's imperfect and inaccurate little work was appropriated and reprinted *verbatim*, without any acknowledgment, in 1818, at London, by Whitelaw and Walsh, whose compilation is full of the most absurd errors. Some of the materials of their work were avowedly gathered from unsubstantiated oral communications, others were taken from printed guide-books of no authority. For instance, the Annals of Dublin, from 1704, the period at which Harris ended, were reprinted without alteration from the concluding pages of a Dublin Almanac. Without exposing ourselves to the reproach of an undue civic vanity, we may assert that Dublin deserved to be made the subject of a history more elaborate and more authentic than the works of either Harris or Whitelaw and Walsh. The metropolis of Ireland possesses trustworthy annals which reach back for more than a thousand years, and has been the scene on which most famous men, Irish, Danes, Anglo-Normans, and English, have played their parts. A writer conscious of the dignity of his subject, and anxious to do it justice, would feel that very extensive researches should be made previous to commencing a history of Dublin. He would see the necessity of examining every printed book, pamphlet, or tract referring to events connected with the history of the city. He would understand the importance of investigating the charters and deeds of its churches, guilds, and corporations, together with the manuscripts in the libraries of Trinity College and the British Museum, the archives of the State Paper Office, and the unpublished records of the Law Courts of Dublin; he would also make himself familiar with its streets, its public buildings, and its monuments. It is because Mr. Gilbert has given proofs of having used diligence and judgment in the collection of his materials from a vast variety of recondite sources, that his work has secured the approval of those who think that scientific accuracy is an essential element of literary excellence. Excluding uncertain or unverified statements, and abstaining from conjectures, he has founded his history solely on documentary evi-

dence, the elaborately minute references to which, at the end of each volume, attest his industry and good faith. The writer of a work constructed on the plan of Mr. Gilbert's *History of Dublin*, has occasion to display the most diversified information and research. He touches upon the general political history of the country in past centuries; he introduces biographical notices of distinguished men; he records and localizes interesting events in the history of religion, letters, science, and art. In each of these departments the reader will find in Mr. Gilbert's history new and precise information, not to be met with elsewhere in print. As illustrating the wide range of subjects treated of under their respective localities, I may cite the account of the Tribe of Mac Gillamocholmog (vol. i., p. 230), traced through unpublished Gaelic and Anglo-Irish records from the remote origin of the family to its extinction in the fifteenth century; while, as a specimen of the work in a totally different department, I may refer to the history of Crow-street Theatre, as giving the only accurate details hitherto published of that once-noted establishment, verified by original documents never before printed, from the autograph of Richard Brinsley Sheridan, and other dramatic celebrities. Mr. Gilbert has interwoven in his work numerous original biographies of eminent natives of Dublin. He has supplied notices of painters, engravers, and medallists, with catalogues of their works, never before collected, and not to be found even in books specially treating of these subjects. He has given us a history of the Parliament of Ireland and the Parliament House; he has recorded the origin and progress of the Royal Dublin Society, the College of Physicians, and the Royal Irish Academy; he has also introduced notices of remarkable literary works published in Dublin, with information respecting their authors. A complete analysis of Mr. Gilbert's volumes would bring into view other interesting classes of subjects which I have left unmentioned; but my enumeration of the topics treated of in the work is sufficiently ample to show that it embraces a most extensive field. To combine such multifarious details into a narrative attractive to a general reader, and at the same time satisfactory to the historical inquirer, seeking precise and authentic information, was not an easy task. Mr. Gilbert is acknowledged to have succeeded eminently in attaining this twofold object. He has produced a work which has been, and will continue to be, read with interest, and referred to as an authority, not only by partial friends and brother Academicians, but by all who may, in our own time or in future generations, study the history and antiquities of the city of Dublin.

MR. GILBERT,—I present to you the medal which the Council of the Royal Irish Academy has awarded to you as the author of a scholar-like work on the *History of Dublin*. You have removed from Ireland the national reproach of having no history of its metropolis. The volumes which you have produced furnish accurate and copious information on the history of every part of the city of which they treat. Let me express the hope that the sympathy in your labours shown by this Academy will encourage you to continue them. To the exertions made

by you and our late President, Dr. Todd, as secretaries of the Irish Archæological and Celtic Society, it is mainly owing that the latter body has been, for many years past, enabled to continue its labours in publishing various works of the utmost importance on the history of Ireland. You have proved your zeal in the cause of Irish history; you are acquainted with its sources and its materials. We have, therefore, good reason to indulge the hope that you will supply some of its many and acknowledged wants.

His Excellency the LORD LIEUTENANT then made the following remarks:—

MR. PRESIDENT AND GENTLEMEN,—I feel sure that I shall command the unanimous assent of the assembly which I have the honour to address, in submitting to them a proposal for requesting the Very Rev. the Dean of the Chapel Royal to permit the able, interesting, and instructive Addresses which he has just delivered to be printed. It would be at once beside the purpose, and beyond my power, to travel again over the ground which has been so fully and luminously explored by him. Most of all should I shrink from entering upon the domain of Dr. Lloyd's researches and discoveries. Of a truth, indeed—

Ne has possim naturæ accedere partes,
Frigidus obstiterit circum præcordia sanguis.

It is not possible, I will only say, to hear or think of Dr. Lloyd without being reminded that even the severest studies and loftiest flights of science seem in his case to be almost effaced by the modest grace and unassuming virtues of his demeanour, character, and life. With respect to Mr. Mallet, whom I think the Rev. President next touched upon, he seems to be to the earthquake something of what Dr. Franklin was to the lightning. But though he has been himself able to detect and track its footsteps, I fear he will not be equally enabled to arrest or to intercept its force. The President has eloquently remarked that Mr. Mallet has followed the course of those tremendous breakers which have rolled in upon the trembling shores, even at vast distances from the points where the ocean-bed had been agitated by subterranean commotions. Our language seems hardly big enough for such magnificent ideas; and if Homer had been alive, he would have called Mr. Mallet *Γαίφοχος εννοσίγαιος*. The President, I think, next touched upon Mr. Stokes; and I am sure our worthy President was quite in his element when he dilated on Irish philology; and most pleasant, indeed, it is to find the son of a father who has himself done so much to lighten suffering and prolong life, showing such a bright promise in the cultivation of those pursuits and humanities which so powerfully contribute to dignify and adorn it. I am sure we shall hail with pleasure the promising career of such a son of such a sire. With respect to Mr. Gilbert, I feel it most gratifying to have our attention directed to so full and accurate a history of the city in which most of the assembly whom I see before me are now living, in which I myself have spent many eventful, and, I will add,

happy years. I anticipate great additional interest to the walks, or rides, or drives which I may happen to take, by having it in my power to learn more of those objects of antique association, or of historic record, by which the capital and its delightful environs are so copiously studded. I only feel warranted in saying, further, that the pleasure with which I find myself amongst the members of this dignified Society is greatly enhanced on this occasion by our being met under the presidency of the Very Rev. Dean, in whom, besides his special adaptation for the immediate studies and pursuits which belong to this Institution, I have found, by competent experience, as complete a proficiency in all the branches of polished learning, in all the amenities of social intercourse, in true kindness and liberality of judgment, and in the benevolence and consistency of the whole Christian character. I beg to conclude by moving that the Addresses to which we have listened to-night may be printed.

The Rev. SAMUEL HAUGHTON, M. A., F. R. S., Fellow of Trinity College, Dublin, read the following paper:—

ACCOUNT OF EXPERIMENTS TO DETERMINE THE VELOCITIES OF RIFLE BULLETS COMMONLY USED.

THE following experiments were made for the purpose of ascertaining the reason of the alleged inferiority of the belted spherical bullet, used with the two-grooved rifle, as compared with elongated bullets of different kinds. The guns compared are the following:—

1. A two-grooved rifle,—length, 31·50 inches; diameter, 0·66 inch; one turn in 4 feet.
2. The regulation Minié rifle,—length, 39 inches; diameter, 0·69 inch.
3. Police carbine,—length, 28·75 inches; diameter, 0·66 inch.

With these guns were used the following bullets:—

Two-grooved Rifle.—1. A Minié bullet, provided with two projections corresponding to the grooves of the rifle, without ‘culots,’ weight 697 grs.; 2. A sugarloaf bullet, fired point foremost, weight 669·75 grs.; 3. A belted spherical bullet, weight 482 grs.

Minié Rifle.—The Regulation Minié bullet, with ‘culot,’ weight 744 grs.

Carbine.—Spherical bullet, weight 391 grs.

The method employed to determine the velocity of the bullets was Robins’ ballistic pendulum; and the same quantity of the best gunpowder (40 grs.) was employed with each gun and bullet.

For the erection of the pendulum, and most efficient assistance afforded in the conduct of the experiments, I am indebted to Mr. Joseph Harris, of the firm of Trulock and Son, Dawson-street, Dublin, without whose aid I should have been unable to bring these experiments to a successful issue.